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ABSTRACT

A technique is described for reducing the incidence of cheating on multiple choice exams. One form of the test is used and each item is assigned multiple numbers. Depending upon the instructions given to the class, some students will use the first of each pair of numbers to determine where to place their responses on a separate answer sheet, while others will use the second number of the pair. Students record their social security number, or other unique identification, in a specified area of the examination and answer sheet. They are instructed to use the final digit of the number to determine which item number they should follow, the first or the second. Most preventative measures to combat cheating include preparation and administration of alternative forms of exams. The cost, in time and manpower, to prepare and use alternative test forms is often prohibitive. Multiple numbering one form of an exam can achieve the same effect. [The technique has been used at Behrend College of Pennsylvania State University.] (DWH)

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MULTIPLE NUMBERING: AN ALTERNATIVE TO ALTERNATIVE TEST FORMS AS A WAY TO REDUCE CHEATING ON MULTIPLE-CHOICE EXAMS

Robert T. Tauber

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In universities introductory courses rank among the most heavily enrolled. With financial resources at a premium, institutions have responded to enrollment pressures by offering large sections. These large sections create particular instructional difficulties, including those associated with cheating during exam administration. The fact that students cheat is well documented and appears to be on the increase (2, 15). Why students cheat (3, 5, 11) and what personal and situational variables predispose students to cheat (6, 10, 13) have been well researched. It is now time to develop programs to discourage and/or prevent cheating (4).

In a typical test site, often filled to near capacity, students are just a glance away from one another's exams. The literature on cheating suggests the use of alternative test forms of exams as a way to curb cheating (1, 7, 8, 9, 12, 14, 16). Unfortunately, the literature does not highlight the problems associated with preparing and using alternative test forms. These problems often make their use impractical. This paper presents an alternative method to alternative test forms that is just as effective in reducing cheating, but vastly reduces clerical preparation and faculty administration time.

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WEAKNESS OF TRADITIONAL ALTERNATIVE TEST FORMS

With the traditional method of alternative test forms, two or more separate exams must be prepared. They must be organized, typed, proofread, and coded. Even if the exams are just the same questions in a different order, typing and proofreading are still required. This is a waste of time, energy, and secretarial resources -- assuming such resources are even available! If entire pages of the exam are switched, not only is extra time and energy still consumed, but one does not truly have an alternative form exam. One glance at the top of a student's test orients fellow student to which questions will follow.

Administration of traditional alternative test forms can be a nightmare. One must keep the two (or more) versions separate and see to it that each row receives the proper test form. This becomes very difficult in auditoriums with staggered seating and in classrooms with movable chairs. In a typical 50 or 60 minute class period there is no time to waste distributing examinations.

Collecting exams, often at the end of a period with a new class of students swarming in, is slowed by the need to separate the different versions of the examinations and their answer sheets. The difficulties continue when it comes time to return the examinations. The instructor now needs to see that students not only receive their own answer sheet but also receive the correct alternative test form. Although inefficient and ineffective, any one of these circumstances might be tolerated. Collectively, the time lost is intolerable.

MULTIPLE NUMBERING: ONE TEST FOR ALL

My alternative method uses the same version of the examination for every student. Only one exam must be organized, typed and proofread. Only one needs to be distributed and collected at test time. Only one examination needs to be

redistributed and collected when reviewing the exam. How is this accomplished? A multiple-numbering system is used. Each question on the exam has two (or more) numbers next to it in the left-hand margin where ordinarily there would be just one number. In the example below, the first question on a hypothetical, 50 item multiple-choice exam is numbered "4/7," the second is "6/2," the third "1/3," the fourth "9/8," and so on. Depending upon the instructions given to the class (outlined below), some students will use the first of each pair of numbers to determine where to place their responses on a separate answer sheet, while other students will use the second of each pair of numbers. Question One on the exam, numbered "4/7," would require some students to place their responses at spot #4 on the answer sheet, while other students would record their responses to this same question at spot #7. As long as students place their answers at different spots on the same answer sheet, the net effect is the same as with the traditional, more time consuming, alternative test form exams -- it reduces the incidence of cheating.

Place Sample Multiple-Numbered Exam about here.

How are students told which number in the pair (trio, etc.) to use throughout the exam? Several techniques can be used, but all include a method of "keying off" some information that is normally only known to an individual student. Students record their social security number in a specific spot on both the examination and the answer sheet. (See the sample social security number, 201-32-8243, as well as the "Instructions to the Student," shown in the above example.) After the examination materials have been distributed, the instructor announces which number, or for that matter, letter, in the recorded

information will be used to "key off." For instance, one might say, "If the last digit of your social security number is ODD (1,3,5,7,9), use the LEFT number of each pair. If EVEN, use the RIGHT number of each pair." In the example social security number, the last digit, "3" is ODD. Thus, this student will place all of his responses on the separate answer sheet using the LEFT number of each pair. So that no later misunderstanding occurs, the student is instructed to circle the number that he will use to "key off."

Many different ways can be used to "key off," such as those students having social security numbers ending in 0,1,2, or 3 use the first number of the trio; those ending in 4, 5, & 6 use the second number of the trio; and those ending in 7, 8 or 9 use the third number of the trio. Note, if social security numbers are used, the last four digits are the only ones randomly assigned by the Social Security Administration. Information other than the social security number may (and should) be used -- birth date, student number, home phone number, etc. Typically, the first exam of the semester is designed with just two numbers per question. This lets the students get used to the multiple-numbering system. Later exams have three numbers per question, which significantly reduces the chance that a student will know which multiple-numbered version even his closest neighbor has. As a little extra insurance, students in every other row (or males vs. females) are instructed to start the exam from the back and work forward -- at least for the first few minutes. Soon, responses begin to appear on different students' answer sheets at different spots, making it very difficult for one student to determine which multiple-numbered version fellow students are using.

When it comes time to collect the examinations, they may be collected in one unsorted pile. When it comes time to return the exam, each student gets a copy of the same exam. When discussing each question on the exam, students do not have to flip from page to page to find the questions as must be done when

traditional alternative test forms of the exam are used. In the multiple-numbered example above, all students would be looking at the first question on the same exam, but some would refer to #4 on their answer sheet while others would refer to #7 to see if they got the question correct.

HOW TO MULTIPLE-NUMBER AN EXAM

When numbering the exam, care must be taken to use all of the numbers; while at the same time, no duplication must occur. This is accompolished by listing, in column fashion, on a separate worksheet, all of the numbers used on a typical exam. The number of columns on the worksheet corresponds to the number of alternatives for each question. For example, if you have two numbers for each question, then you would use two columns on your worksheet. (See sample worksheet of columns below.) To multiple-number the exam, take a number from the first column, cross it out. Then take any number from the second column, and cross it out also. By repeating this process for the number of questions on the exam, one is sure to have used all the numbers in each column without any repeats.

Place Sample Worksheet of Columns about here

Numbers should be selected from each of the columns in sets of ten. First, choose numbers between 1 and 10 from each of your worksheet columns. Then choose numbers from 11-20, 21-30, 31-40, etc., from the same columns. The result is that all students, regardless of the column they "key off" on, place their responses on the answer sheet at about the same spot, making it even more difficult to cheat. Selecting numbers this way has the added advantage of

having students progress through the test in a manner similar to how they would if it were traditionally numbered. Multiple-numbering takes far less time and effort than does the clerical preparation and the administration of traditional alternative test form exams.

STUDENT REACTION

To set the stage for acceptance of the multiple-numbered exams, the following statement is included in the instructions to the students, "In order to respond to student concerns about cheating, we will use a slightly different method of recording answers." A dry run with the multiple-numbering method is conducted prior to the first exam. Although students are introduced to several examples of multiple-numbered questions through the use of an overhead transparency, and told how they will place their answers at different spots on answer sheets, they are not told exactly how they will "key off."

Informal student feedback, solicited at the time the first exams of the semester were turned in, sampled whether or not the multiple-numbering system caused any interference in their test taking. Students leaving the exam site, from 150 students taking their first Introductory Economics exam to 40 students taking an Educational Psychology exam, resoundingly said "No." They indicated that the little extra time it did take to locate the proper spot on the answer sheet to record their responses was more than offset by the feeling that cheating had been reduced. When the same type of multiple-numbering system was used on subsequent exams, little mention of the system was made by the students. Formal feedback, in the form of optional questions added to their final exams, confirmed the students' belief that the method was effective in the prevention of cheating.

SUMMARY

Cheating is perceived by faculty and students to be a widespread problem, one that demands action. Almost every list of preventative measures includes preparing and administering alternative test forms of exams. Unfortunately, the cost, in time and manpower, to prepare and use alternative test forms of exams is often prohibitive. Multiple-numbering just one form of an exam can achieve the same effect -- reduced opportunities for students to cheat on multiple-choice exams.

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Sample Multiple-Numbered Exam

EDUCATION 102 Name _____

Fall Semester SS# ___-___-____

Record your name and social security number above and on the answer sheet. Circle the LAST digit of your social security number.

In order to respond to students' concerns about cheating, we will use a slightly different method of recording answers. Each of the test questions has two numbers next to it. For example, the first question has 4/7.

If the LAST digit of your social security number is ODD (1,3,5,7 or 9), use the FIRST of the two numbers to answer ALL questions. The answer to the first exam question will go on your answer sheet at spot #4.

If the LAST digit of your social security number is EVEN (2,4,6,8 or 0), use the SECOND of the two numbers to answer ALL questions. The answer to the first exam question question will go on your answer sheet at spot #7.

Thus, even if you have the same test, you will record your answers in different spots on the answer sheet. Be sure to use either the FIRST or the SECOND number of each pair for ALL of your responses. If you have any question about this new procedure, please raise your hand.

4 / 7 In using the Educational Resources Information Center (ERIC), the six digit number "ED 205 995" indicates that it came from what index?

a. Education Index

b. Resources in Education (RIE)

c. Current Index to Journals in Education (CIJE)

d. None of the above

6 / 2 Of the following sources, which is more likely to provide one with the most information without having to go beyond that particular index?

a. Education Index

b. RIE

c. CIJE

1 / 3 ERIC would best be described as a <u>decentralized</u> system of bibliographic control and retrieval.

a. True b. False

9 / 8 Within three years one way or the other, when was ERIC founded?

a. 1980 b. 1975 c. 1966 d. 1954

Sample Worksheet of Columns

Col #1	Col #2	Col #3	Col #4

(The number of columns corresponds to the number of numbers each test question will have -- two columns = two numbers, three columns = three numbers, etc.)

1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
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.	.	.	.
.	.	.	.
100	100	100	100